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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/667,576	09/22/00	TSUZAKI T	50212-132

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PM82/1018

EXAMINER	
CUNNINGHAM, S	
ART UNIT	**PAPER NUMBER**
3662	5

DATE MAILED: 10/18/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)	
	09/667,576	TSUZAKI ET AL.	
	Examiner	Art Unit	
	Stephen C Cunningham	3662	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 September 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claim 1, 2, 3, 5, 6, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita in view of Clapp.

   With respect to claim 1, Kinoshita teaches a plurality of optical amplification sections each doped with a fluorescent material. See figure 2. Kinoshita teaches an optical pumping light source for pumping said optical amplification section. See figure 2. Kinoshita teaches a control means for controlling an optical pumping light output from said optical pumping source such that light power such that light power after amplification has a predetermined target value. See p. 259 first full paragraph line 6. The control means also adjusts a characteristic of an optical filter (variable attenuator). See figure 2. Kinoshita fails to teach a filter capable of adjusting a gradient of loss with respect to wavelength. Clapp teaches a filter that is capable of adjusting the gradient of loss with respect to wavelength. See Principle of operation lines 19 and 20. It would have been obvious to modify Kinoshita in view of Clapp in order to compensate for gain tilt and thereby preventing loss of channels.

With respect to claim 2, it would have been obvious for the optical filter to satisfy

$$L \cong a(\lambda - \lambda c) + b$$

because the gradient changes according to **a** as the slope of a linier function linier function and gain tilt is roughly a linier function in the commonly used bands.

With respect to claim 5 and 6, an input power monitor is inherent in automatic gain control. Kinoshita teaches the use of an automatic gain control (AGC) device. It would have been obvious to use the detection device from the AGC to supply information to the control means for controlling the gradient of the optical filter in order to reduce the number of components needed in the system.

With respect to claim 12, Clapp describes the balance point (λc) as being adjusted in the predetermined wavelength band.

2. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita in view of Clapp as applied to claim 1 above, and further in view of Okuno.

The apparatus of Kinoshita in view of Clapp fails to teach the use of a wave number Monitor for detecting the number of signal light components contained in the multiplexed signal light. Okuno teaches the use of a wave number Monitor for detecting the number of signal light components contained in the multiplexed signal light, and where in the control means adjusts the target value of light power after amplification in accordance with the number of signal light components detected by the monitor. It would have been obvious to modify

the apparatus to include the channel counting device of Okuno in order to allow for the number of channels to be variable. It would have been obvious to use the detection device for the channel counter to supply the control means with information regarding the gain tilt in order to limit the number of components necessary for the apparatus and also to make the filter automatically adjusting to the conditions of the apparatus.

3. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita in view of Clapp as applied to claim 1 above, and further in view of Inoue.

With respect to claim 7, the apparatus of Kinoshita in view of Clapp fails to explicitly teach means for detecting each wavelength and power of signal light components contained in the light output from said optical amplification section. Inoue teaches means for detecting each wavelength and power of signal light components. It would have been obvious to supply information from the spectrum detecting means to the control for the filter, that is used to adjust the tilt in the spectrum, in order to achieve automatic tilt correction.

With respect to claim 8, it would have been obvious to include read means for receiving information related to the shortest and the longest wavelengths in order to minimize the wavelength dependent differences (level, gain, noise, dispersion...) in the system.

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita in view of Clapp as applied to claim 1 above, and further in view of Taylor.

The apparatus of Kinoshita in view of Clapp fails to teach ASE detection means. Taylor teaches ASE detection means for detecting ASE levels and control means for adjusting the gradient of a filter so that the level difference between ASE light levels becomes constant.

5. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita in view of Clapp as applied to claim 1 above, and further in view of Kinoshita '366.

With respect to claim 10, Kinoshita '366 teaches ASE level detection across the spectrum from a wavelength shorter than the shortest signal wavelength to a wavelength longer than the longest signal wavelength. It would have been obvious to modify the apparatus to detect the ASE spectrum and use that detection to control the filter in order to flatten the ASE spectrum and thereby improving system performance.

With respect to claim 11, reading information from signals sent in the multiplexed signal is well known in the art. It would have been obvious to read from a longest and shortest wavelength signal in order to minimize wavelength dependant deleterious effects.

6. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita in view of Clapp as applied to claim 1 above, and further in view of Tsuchiya.

Clapp teaches the filter of claim 13 but fails to teach that the sub optical paths of regions 2 and 5 have different lengths from the main optical path of the

corresponding region. Tsuchiya teaches a filter where the sub optical path has a different length from the main optical path. It would have been obvious to modify the cascaded symmetrical Mach-Zehnder filter of Clapp to be a cascaded asymmetrical (sub optical path length different from main path length) Mach-Zehnder filter in order to take advantage of the asymmetrical Mach-Zehnder filter's multiplexing/demultiplexing properties.

7. Claims 14, 15, 16, 20, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maxham in view of Clapp.

With respect to claim 14, Maxham teaches claim14 except he fails to teach an optical filter. Clapp teaches guiding a WDM signal through an optical filter capable of changing a gradient of loss with respect to wavelength and adjusting the gradient to reduce wavelength-dependent gain in the amplification.

With respect to claim 15, it would have been obvious to adjust the gradient according to a linier function because gain is approximately linier in the commonly used bands.

With respect to claim 16, Clapp teaches the use of gain equalizers.

With respect to claim 25, Clapp teaches a λc in the wavelength band.

With respect to claim 26, Clapp teaches a balance point that would provide loss substantially constant and independent of wavelength.

8. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maxham in view of Clapp as applied to claim 14 above, and further in view of Okuno.

Okuno teaches detecting the number of signals light components contained in the multiplexed signal light and adjusting the target value of the light power after amplification in accordance with the detected number of signal light components. It would have been obvious to modify the method to account for changes in the number of signals in order to make the system more efficient.

9. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maxham in view of Clapp as applied to claim 14 above, and further in view of Taylor.

Taylor teaches adjusting the gradient on the basis of light power of the multiplexed signal light. It would have been obvious to modify Maxham in view of Clapp to adjust the filter according to the light power.

10. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maxham in view of Clapp as applied to claim 14 above, and further in view of Sugaya '275.

Sugaya '275 teaches adjusting the gain tilt according to the ASE spectrum, which corresponds to the gain tilt. It would have been obvious to modify the method of Maxham in view of Clapp in order to flatten out the gain spectrum.

11. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maxham in view of Clapp as applied to claim 14 above, and further in view of Sugaya '289.

Sugaya '289 teaches using a supervisory signal. It would have been obvious to monitor a shortest and a longest supervisory signals in order to correct for wavelength dependent deleterious effects.

12. Claims 22, 23, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maxham in view of Clapp as applied to claim 14 above, and further in view of Kinoshita '366.

With respect to claim 22, the method of detecting ASE light levels of each of wavelength outside two ends of the predetermined wavelength band and adjusting the tilt based on the difference is taught by Kinoshita '366. It would have been obvious to modify the method of Maxham in view of Clapp to adjust for the ASE in order to improve system performance.

With respect to claim 23, Kinoshita '366 teaches detecting ASE at wavelengths shorter and longer than the signal wavelengths. It would have been obvious to modify the method to detect ASE at these wavelengths in order to flatten the ASE spectrum.

With respect to claim 24, supervisory signals are well known in the art. It would have been obvious to modify the method to incorporate a longest wavelength and a shortest wavelength supervisory signal in order to account for wavelength dependent deleterious effects.

13. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maxham in view of Clapp as applied to claim 1 above, and further in view of Tsuchiya.

Clapp teaches the filter of claim 13 but fails to teach that the sub optical paths of regions 2 and 5 have different lengths from the main optical path of the corresponding region. Tsuchiya teaches a filter where the sub optical path has a different length from the main optical path. It would have been obvious to modify

the cascaded symmetrical Mach-Zehnder filter of Clapp to be a cascaded asymmetrical (sub optical path length different from main path length) Mach-Zehnder filter in order to take advantage of the asymmetrical Mach-Zehnder filter's multiplexing/demultiplexing properties.

Additional Citations

The examiner would like to cite Toyohara for teaching the use of channel counters.

The examiner would like to cite Alexander et al. and Baney et al. for teaching noise monitoring means.

The examiner would like to cite Nishimura et al. because it teaches a variable optical attenuator for level equalization and includes Mach-Zehnder interferometers.

The examiner would like to cite Hatayama et al. for teaching a thermally adjusted variable Mach-Zehnder filter.

The examiner would like to cite Offrein et al. for teaching cascaded Mach-Zehnder filters for adaptive gain equalization.

The examiner would like to cite Pan et al. This article discusses the transmittance characteristics of a Mach-Zehnder gain equalizing filter.

The examiner would like to cite Okamoto et al. This article teaches the use of an asymmetrical Mach-Zehnder filter to achieve a flat spectral response with an arrayed-waveguide grating.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen C Cunningham whose telephone number is 703-605-4275. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on 703-306-4171. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7687 for regular communications and 703-305-7687 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-4180.

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October 15, 2001

Thomas H. Tarcza

THOMAS H. TARCZA
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